ON THREE NEW SPECIES OF GAMASID MITES FOUND ON RATS.

By Stanley Hirst.

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The great majority of the Gamasidae are not parasitic in habit, but a number of true parasites belonging to this family are known to occur on vertebrates and on arthropods. They are most often found on birds and small mammals, especially on bats and rodents.

Gamasid mites belonging to several different genera are known to occur on the species of rats which frequent human habitations ; the following is a list of these genera :—*Myonyssus*, *Leiognathus* (=*Liponyssus*), *Dermanyssus* (*Liponyssoides*), *Laelaps* and *Haemogamasus*. In view of the possibility that some of the mites of this family found on rats may convey plague or leprosy to human beings, special attention ought to be directed in future to their habits and distribution. Numerous cases of *Dermanyssus avium* attacking human beings have been recorded by various authors and more than one species of *Laelaps* and of *Leiognathus* have been found on man,[*] although, of course, not their proper host.

In the genus *Laelaps* the fingers of the chelicerae (mandibles) of the female are rather short, fairly stout, and armed with distinct teeth (instead of being slender and pointed, as is usually the case in *Leiognathus*, or united to form a very long style, as in *Dermanyssus*) ; one would imagine, indeed, from the general appearance of the chelicerae, that the mites of this genus were not parasites, but preyed upon other arthropods. Dr. C. Tiraboschi[†] and the late Mr. W. W. Miller[‡] state in their papers, however, that species of *Laelaps* occurring on rats are true parasites, and suck the blood of their hosts. In other details of structure, especially in the presence of a series of minute denticles on the ventral surface of the capitulum, most of these parasitic species of *Laelaps* present so much resemblance to *Leiognathus*, etc., that I think they should be placed in the same subfamily (Dermanyssinae), instead of in the separate subfamily (Laelaptinae), in which they are usually put.

The figures of *Dermanyssus muris* have been drawn by Mr. Horace Knight, those of *Laelaps echidninus* by Mr. Engel Terzi.

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[*] P. Mégnin's "Parasites et Maladies Parasitaires" (1880) and Prof. L. G. Neumann's "Treatise on the Parasites and Parasitic Diseases of Domesticated Animals" (English Edition, 1892). Neumann has also published an account of a case in which *Laelaps stabularis*, Koch, was found in great numbers in a house and seriously affected the health of one of the inmates (C. R. Soc. Biol. (9) v, 1893, p. 161). See also my little paper "On two new Parasitic Acari of the genus *Leiognathus*, Cn." (Bull. Ent. Res. iii, 1912, p. 369). A number of instances of the Gamasid parasites of rats and birds making attacks on human beings in Australia are given by Dr. J. Burton Cleland in an interesting paper entitled "Injuries and Diseases of Man in Australia attributable to animals (except insects)" (J. Trop. Med. xvi, no. 3, 1913, p. 43).

[†] Arch. Parasit., Paris, viii, 1904, p. 342.

[‡] Washington, D. C., Treas. Dept.. Pub. Hlth. Mar. Hosp. Serv., Hyg. Lab., Bull. no. 46, 1908, p. 25.

Genus DERMANYSSUS.

Subgenus *Liponyssoides*, nov.

Capitulum somewhat longer and narrower than is the case in the typical species of *Dermanyssus*. Chelicera of male furnished with a long accessory process (flagellum) which is armed with a little tooth.

Dermanyssus (Liponyssoides) muris, sp. n. (figs. 1–2).

♀. *Body* rather long oval, but its exact shape varies considerably, for it is sometimes much swollen with ingested blood. *Scutum* long and rather narrow, leaving much of the dorsal surface uncovered; it is wedge-shaped, being gradually and progressively narrowed posteriorly; the posterior end is very slightly rounded (almost truncate). A number of fine hairs, of moderate length, are present on its surface; for the greater part of the length of the scutum these hairs are mostly arranged in transverse series of four or six hairs or in pairs; on the posterior part of the scutum there are only pairs of hairs. *Sternal plate* trapezoidal in shape, and furnished with three long fine hairs on each side. The plate which is situated behind the genital operculum is long, narrow and wedge-shaped, gradually diminishing in width posteriorly, its end being blunt; there is a pair of rather long fine hairs on this plate and they are placed opposite the fourth coxa. *Anal plate* heart-shaped and furnished with the usual three hairs, which are rather long and fine; posterior margin of this plate punctured in a striate fashion. *Peritreme* long, extending as far forwards as the coxa of the second leg or slightly beyond it. Some distance in front of the anterior end of the peritreme, there is present (at least in the specimens from Colombo) a little round eye-like structure, but owing to its position it is very difficult to see.

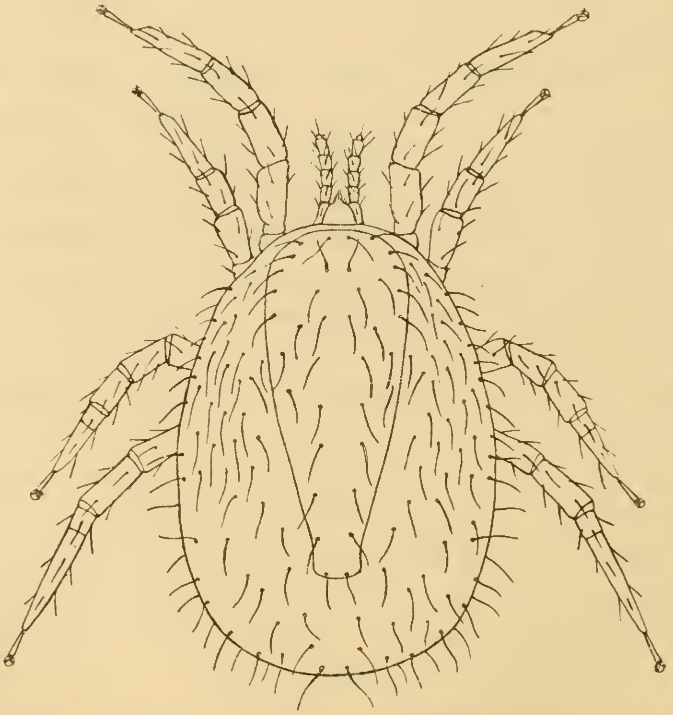

Fig. 1.—*Dermanyssus* (*Liponyssoides*) *muris*, Hirst, dorsal view of female.

Anterior surface of *second coxa* armed dorsally with a sharp forwardly directed spur ; there are no spurs on the other coxae. *Capitulum* more elongated than is the case in *D. gallinae*, Redi, and the paired hairs on its ventral surface are long and very fine ; the narrow central strip of the ventral surface of the capitulum is armed with a file of minute denticles. *Chelicera* very long and styliform, as in *D. gallinae ;* one edge is strongly chitinised, but the greater part of the width of the chelicera is very thin and transparent. *Colour* (in spirit) reddish brown ; occasionally two or more whitish spots or patches are visible on the surface of the body, but they are evidently due to internal glands showing through the skin. *Length* of body 1·35 mm. ; of scutum 0·9 mm.

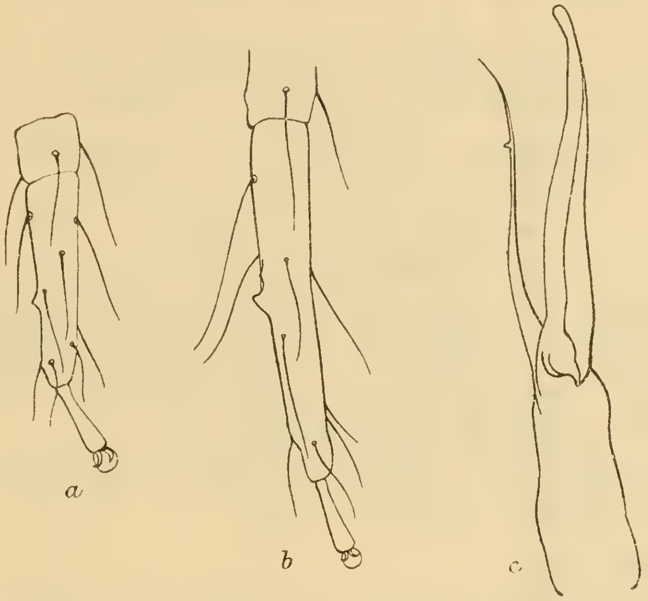

Fig. 2.—*Dermanyssus* (*Liponyssoides*) *muris*, Hirst, ♂ ; (*a*) tarsus of third leg, (*b*) tarsus of fourth leg, (*c*) chelicera.

♂. *Chelicera* rather long, but very much shorter than that of the female ; both fingers can be distinguished, but they are placed very close together ; near the base of the fingers, a long slender process, of about the same length as the digits themselves, is given off, and it is furnished with a sharp little tooth (fig. 2*c*). *Tarsi* of the legs of the third and fourth pairs long and slender ; and there is a little conical projection near the middle of the ventral surface of the distal portion of these tarsi (fig. 2*a*, *b*).

The only male specimen of this species in my possession is rather badly damaged, hence I cannot describe the plates of the body.

Material. A number of specimens collected on rats (*Mus rattus*) at various localities in the city of Madras (Triplicane, Parktown, Chepawk, Georgetown (Lothwell Market), Pursewakum, Vepery) ; also specimens found on *Mus rattus* at Colombo. These were received from *Dr. L. F. Hirst*—the Colombo examples being collected by him. Since writing the above description I have received a very large number of specimens of this species taken on *Mus rattus* at Assiût, Egypt. My best thanks are due to Dr. C. J. Martin, F.R.S., and Mr. A. Bacot for their kindness in lending me this material.

This and the following new species of *Dermanyssus* are apparently found only on rats, and this is somewhat remarkable, for birds are the normal hosts of all the other species of *Dermanyssus* hitherto described. Ingested blood was present in both the male and female specimens.

Dermanyssus (Liponyssoides) aegyptius, sp. n.

♀. Closely allied to *D.* (*Liponyssoides*) *muris* but differing in the following respects:—*Scutum* much narrower, the posterior part of it being very much narrowed (almost linear); arrangement of hairs on scutum very similar, however, to what it is in *D. muris*. *Sternal plate* with only two pairs of hairs, but there is a pair of little plates behind the sternal one, and each of them bears a hair. The plate which is situated behind the genital orifice is sharply pointed at its posterior end. *Anal plate* quite different in shape from that of *D. muris*, being long ovate instead of heart-shaped. There is no spur on the anterior surface of the coxa of the second leg. *Length* of body 1·9 mm.

Material. I have examined specimens of this species taken on the following hosts—(1) *Acomys cahirinus;* over two hundred specimens captured at Assiût (and on the feluccas at that town); also at Kous. (2) *Mus rattus;* numerous specimens found on this host at Assiût, and a few at Kous. (3) *Arvicanthis* sp., in houses at Assiût. Also some specimens from El-Weladie; no host given. It is through the kindness of Dr. C. J. Martin, F.R.S., and Mr. A. W. Bacot of the Lister Institute, that I have had the opportunity of examining these specimens; they were collected by Dr. Petrie.

The above description is of a preliminary nature; the species will be described at greater length and figured in another paper.

Leiognathus bacoti, sp. n.

♀. *Scutum* long and narrow, leaving most of the dorsal surface uncovered; it is widest at a short distance from the anterior end, diminishing gradually (but not in a very regular manner) in width posteriorly, the terminal part of it being quite narrow. Hairs on the scutum of moderate length, on the anterior half of it they are fairly numerous, but posteriorly they occur only in pairs; there are six of these pairs of hairs on the posterior half, three of them being placed close together on the margins of the extreme end of it. *Sternal plate* trapezoidal in shape, and furnished with three pairs of fine and fairly long hairs, those of the posterior pair being situated at the posterior angles. Genital operculum continued posteriorly by the usual plate, which is long, slender and rather sharply pointed at the end; a pair of hairs is present on this plate, opposite the fourth coxae. *Anal plate* long and pear-shaped, its posterior end is finely striated; the usual three hairs are present on this plate. Fingers of *chelicera* short and apparently without any teeth. *Coxae* of legs without any well-marked spurs. *Peritreme* apparently extending as far forwards as the anterior surface of the first coxa. *Length* ·8 mm.

Material. Five female specimens found on *Mus norvegicus* on the feluccas at Assiût (Dr. Petrie).

This species seems to resemble *L. saurarum*, Oudemans, somewhat in the narrowness of its scutum, but differs from that species in many other structural details.

Laelaps echidninus, Berlese (figs. 3, 4).

♀. *Body* oval in shape. Almost the entire dorsal surface is covered by the *scutum*, but a marginal strip of soft skin is left unprotected. Hairs on scutum long, fine and fairly numerous. *Ventral plates* with much finer hairs than in *L. agilis*, C. L. Koch. *Peritreme* long, its anterior end being situated opposite (or a little in front of) the coxa of the first leg. *Coxa* of first leg furnished posteriorly with a strong seta, of moderate length, and also with a stout and rather blunt little thorn. Second and third coxae each with a similar thorn on their posterior surfaces. Fourth coxa with a smaller and more slender thorn (spine). The narrow central strip of the ventral surface of the *capitulum* is armed throughout its length with minute denticles. Movable finger of *chelicera* with two little teeth, which are placed close together ; the distal end of this finger is slightly curved. Immovable finger with a single minute tooth. (For the shape of the seta of the immovable finger *see* fig. 4). *Colour* brownish. *Length* of body 1·1 mm.

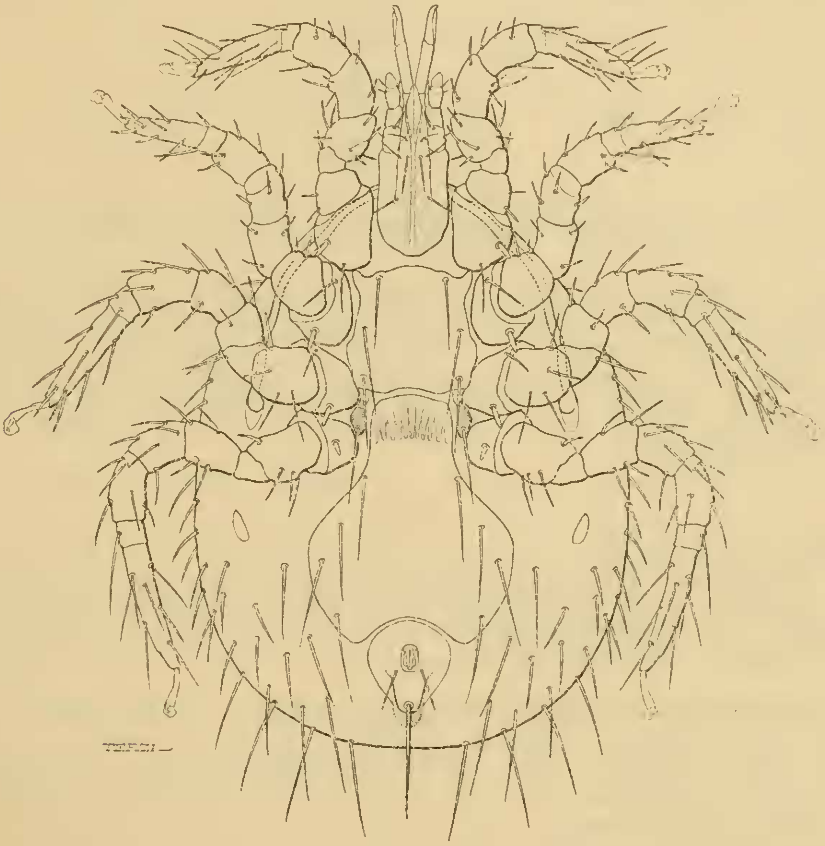

Fig. 3.—*Laelaps echidninus*, Berlese, ventral view of female.

Material. Numerous specimens found by the author and his brother (*Dr. L. F. Hirst*) on rats (*Mus norvegicus*) from Barking Creek and other specimens captured on rats taken at Tilbury Docks (*Dr. Willoughby*). We are indebted to Dr. Herbert Williams (principal Medical Officer of Health for the Port of London) for his kindness in forwarding the Tilbury specimens to the Museum. Also specimens taken on *Mus norvegicus* in the United States

(*Hugh Glasgow*, presented to the Museum by the Imperial Bureau of Entomology) and others captured on *Mus rattus* at Colombo (*L. F. Hirst*).

Dr. A. C. Oudemans states* that *L. echidninus*, Berl., is identical with *L. hilaris*, Koch. He kindly lent me for a short time some specimens of the species which he considers to be *L. hilaris*. The female specimens which he sent me (taken on *Mustela vulgaris* at Gramsbergen) represent a species which is certainly quite distinct from *L. echidninus*, the sternum of these specimens being much wider as compared with its length, and the spines on the tarsus of the fourth leg much shorter as compared with the length of this segment of the limb, than in *L. echidninus*.

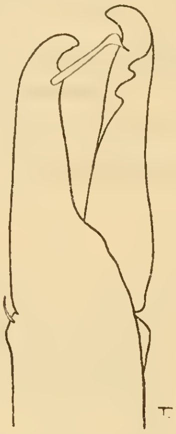

Fig. 4.—*Laelaps echidninus*, Berlese, ♀, side view of chelicera.

Laelaps agilis, C. L. Koch.

Material. A number of specimens of this species captured on *Arvicola* sp. and on *Talpa europea* at Grunberg, Germany, 9th July 1910 (*R. E. Hoffmann*), have been presented to the British Museum by the Hon. N. C. Rothschild. We have also some mounted preparations and a number of specimens in spirit taken on water voles (*Arvicola* sp.)—these specimens have no history or locality, but probably they are English. Dr. A. C. Oudemans has also lent me some specimens captured in Holland.

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* Ent. Ber. Nederland Ver. III, 1912, p. 262.